

CLAIMS

What is claimed is:

Sub
A
1. A dry etching process including:
introducing a processing gas into a vacuum chamber to
5 achieve a predetermined controlled pressure level therein;
applying radio frequency power to a substrate placed
within the vacuum chamber for generating plasma in the vacuum
chamber, whereby the substrate is processed, the substrate
having a plurality of stacked layers including metal layers;
0 etching the layers on the substrate with the processing
gas until a time point when the surface of a lowermost layer
on the substrate is etched; and
adding CHF₃ gas to the processing gas for etching the
lowermost layer on the substrate.

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2. The dry etching process according to Claim 1,
wherein the etching process is effected through a method of
determining a layer being processed.

3. The dry etching process according to Claim 1,
wherein the lowermost layer on the substrate is the subject to
be etched.

4. The dry etching process according to claim 2,
wherein the method of determining is monitoring the etching

process by detecting plasma light intensity.

5. The dry etching process according to Claim 4,
wherein the processing gas is one of Cl_2 and a gaseous mixture
5 containing Cl_2 .

6. The dry etching process according to Claim 5,
wherein a non-aluminum reactive gas is added when the
substrate includes a layer of aluminum.

7. The dry etching process according to Claim 6,
wherein the proportion of CHF_3 gas is 40% or less with respect
to the total flow rate of the processing gas.

8. The dry etching process according to Claim 6,
wherein the proportion of CHF_3 gas is between 5% and 40% with
respect to the total flow rate of the processing gas.

9. The dry etching process according to Claim 6,
wherein the proportion of CHF_3 gas is 15% or less with respect
to the total flow rate of the processing gas.

10. The dry etching process according to Claim 6,
wherein the proportion of CHF_3 gas is between 5% to 15% with
respect to the total flow rate of the processing gas.

11. The dry etching process according to Claim 6,
wherein the proportion of CHF₃ gas is between 15% to 40% with
respect to the total flow rate of the processing gas.

12. The dry etching process according to one of Claims
7-11, wherein the lowermost layer on the substrate includes
titanium.

13. The dry etching process according to one of Claims
7-11, wherein the metal layers of the plurality of stacked
layers comprise an aluminum middle layer and titanium top and
bottom layers.

14. The dry etching process according to Claim 2,
wherein the method of determining is based upon the sampling
data obtained from the experimentation.

15. The dry etching process according to Claim 14,
wherein the processing gas is one of Cl₂ and a gaseous mixture
containing Cl₂.

16. The dry etching process according to Claim 15,
wherein a non-aluminum reactive gas is added when the
substrate includes a layer of aluminum.

17. The dry etching process according to Claim 16,
wherein the proportion of CHF₃ gas is 40% or less with respect
to the total flow rate of the processing gas.

18. The dry etching process according to Claim 16,
wherein the proportion of CHF₃ gas is between 5% and 40% with
respect to the total flow rate of the processing gas.

19. The dry etching process according to Claim 16,
wherein the proportion of CHF₃ gas is 15% or less with respect
to the total flow rate of the processing gas.

20. The dry etching process according to Claim 16,
wherein the proportion of CHF₃ gas is between 5% and 15% with
respect to the total flow rate of the processing gas.

21. The dry etching process according to Claim 16,
wherein the proportion of CHF₃ gas is between 15% and 40% with
respect to the total flow rate of the processing gas.

22. The dry etching process according to one of Claims
17-21, wherein the lowermost layer on the substrate includes
titanium.

23. The dry etching process according to one of Claims 17-21, wherein the metal layers of the plurality of stack d layers comprise an aluminum middle layer and titanium top and bottom layers.

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